

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

- 1 1. (Original) A global, paperless, aircraft maintenance system comprising:
- 2 an aircraft performance means for detecting aircraft performance and control
- 3 parameters;
- 4 a maintenance communications means, located on board an aircraft, for providing
- 5 maintenance advice to maintenance personnel;
- 6 a sensor multiplexer receiver and transmitter means, located on board said
- 7 aircraft, for:
- 8 accepting said aircraft performance and control parameters;
- 9 converting said aircraft performance and control parameters, when
- 10 necessary, to digital form;
- 11 adding an aircraft identification and configuration label;
- 12 converting said aircraft performance and control parameters and said
- 13 identification and configuration label to an outgoing rf signal and
- 14 broadcasting said outgoing rf signal; and
- 15 receiving an incoming rf signal, converting it to a maintenance advisory,

16 and feeding said maintenance advisory to said maintenance
17 communication means;
18 an aircraft manufacturer's database means for providing aircraft data and
19 maintenance information;
20 a central station means, located on the ground, for receiving said outgoing
21 rf signal and converting it to said aircraft performance and control
22 parameters and said aircraft identification and configuration label, and
23 broadcasting said incoming rf signal;
24 a processing means, connected to said central station means, for:
25 archiving said aircraft performance and control parameters thus
26 creating an archived data database;
27 combining said aircraft performance and control parameters with
28 said aircraft data and said maintenance information;
29 generating said maintenance advisory; and converting said
30 maintenance advisory to said incoming rf signal;
31 a display and control means, connected to said processing means,
32 for displaying operation of said processing means and for
33 allowing operator control of said processing means; and
34 a global rf communications network means for conveying said

35 outgoing signal from said aircraft to said central station means
36 and conveying said incoming rf signal from said central station
37 means to said aircraft.

1 2. (Original) A global, paperless, aircraft maintenance system comprising:
2 aircraft sensors which detect aircraft performance and control parameters;
3 means, located on board an aircraft, for providing maintenance advice to
4 maintenance personnel;
5 a sensor multiplexer receiver and transmitter, located on board said aircraft,
6 which:
7 accepts said aircraft performance and control parameters;
8 converts said aircraft performance and control parameters, when
9 necessary, to digital form;
10 adds an aircraft identification and configuration label;
11 converts said aircraft performance and control parameters and said
12 aircraft identification and configuration label to an outgoing rf signal and
13 broadcasts said outgoing rf signal; and
14 receives an incoming rf signal, converts it to a maintenance advisory,
15 feeds said maintenance advisory to said maintenance communication

16 means;

17 an aircraft manufacturer's database for providing aircraft data and maintenance

18 information;

19 a central station, located on the ground, which receives said outgoing rf signal

20 and converts it to said aircraft performance and control parameters and said

21 aircraft identification and configuration label, and broadcasts said incoming rf

22 signal;

23 a processing means, connected to said central station, for:

24 archiving said aircraft performance and control parameters thus creating

25 an archived data database;

26 combining said aircraft performance and control parameters with the

27 archived data, and said aircraft data and maintenance information;

28 generating said maintenance advisory; and

29 converting said maintenance advisory to said incoming rf signal;

30 a display and control subsystem, connected to said processing means, and

31 a global rf communications network which conveys said outgoing signal from

32 said aircraft to said central station and conveys said incoming rf signal from said

33 central station to said aircraft.

1 3. (Original) A method of providing global, paperless, aircraft maintenance advisories
2 comprising the steps of:

3 mounting a performance sensor in an aircraft;

4 mounting a control sensor in said aircraft;

5 mounting a means in said aircraft, for providing maintenance advice to maintenance
6 personnel;

7 mounting a sensor multiplexer receiver and transmitter system, in said aircraft;

8 providing communications access to an aircraft manufacturer's database;

9 providing a central ground based station;

10 providing a processing means within said central ground based station;

11 providing a display and control subsystem, connected to said processing means;

12 providing a global, rf communications network;

13 accepting signals from said aircraft performance and control sensors into said sensor
14 multiplexer receiver and transmitter;

15 converting, in said sensor multiplexer receiver and transmitter, said signals from said
16 aircraft performance and control sensors, when necessary, to digital form;

17 adding an aircraft identification and configuration label;

18 converting said signals from said aircraft performance and control sensors, and said
19 aircraft identification and configuration label, in said sensor multiplexer receiver and

20 transmitter, to an outgoing rf signal;
21 transmitting said outgoing rf signal from said sensor multiplexer receiver and transmitter
22 to said central ground base station via said global rf communications network;
23 receiving said outgoing rf signal at said central ground based station;
24 converting said outgoing rf signal at said ground based central station to said aircraft
25 performance and control signals plus said aircraft identification and configuration label;
26 performing within said processing means the steps of:
27 archiving said aircraft performance and control signals thus creating an archived
28 data database;
29 combining said aircraft performance and control signals with the archived data,
30 and information from said aircraft manufacturer's database;
31 generating maintenance advisories; and
32 converting said maintenance advisories to an incoming rf signal;
33 sending said incoming rf signal, via said global communications network, from said
34 central ground based station to said sensor multiplexer receiver and transmitter;
35 converting said incoming rf signal, at said sensor multiplexer receiver and transmitter, to
36 said maintenance advisories; and
37 feeding said maintenance advisory from said sensor multiplexer receiver and transmitter
38 to said maintenance communication means.

4-63. (Canceled)

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1 64. (New) An aircraft maintenance system comprising:
2 a transmitter portable to be placed on an aircraft, said transmitter configured for
3 transmission of digital performance data across a communication network
4 while said aircraft is in flight; and
5 a central station connected to said communication network configured to receive and
6 analyze said transmission of digital performance data to generate maintenance
7 advice for said aircraft in real-time,
8 wherein said digital performance data includes an identifier unique to a particular
9 aircraft.

1 65. (New) The aircraft maintenance system of claim 64 wherein said aircraft includes a
2 flight data recorder and at least a portion of said digital performance data comprises data
3 directed to said flight data recorder.

1 66. (New) The aircraft maintenance system of claim 64 further comprising:
2 a sensor multiplexer located on said aircraft, said sensor multiplexer having a
3 plurality of inputs for receiving aircraft performance and control parameters from
4 existing aircraft sensors, and an output in communication with said transmitter for
5 providing said digital performance data to said transmitter.

1 67. (New) The aircraft maintenance system of claim 64 wherein said digital performance
2 data further includes digitized audio information.

1 68. (New) The aircraft maintenance system of claim 64 wherein said digital performance
2 data further includes digitized video information.

1 69. (New) The aircraft maintenance system of claim 65 wherein said digital performance
2 data includes aircraft position data directed to said flight data recorder.

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1 70. (New) The aircraft maintenance system of claim 69 wherein information provided by a
2 GPS receiver is used in the calculation of said aircraft position data.

1 ¹¹
1 71. (New) The aircraft maintenance system of claim 70 wherein information provided by an
2 inertial navigation system is used in the calculation of said aircraft position data.

1 ¹²
1 72. (New) The aircraft maintenance system of claim 64, wherein said central station is
2 further configured to transmit digital data on said communication network and said
3 maintenance advice is transmitted from said central station to said receiver, the aircraft
4 maintenance system further comprising:
5 a receiver on said aircraft configured to receive digital data from said
6 communication network; and

7 a maintenance communication means, located on said aircraft, for providing
8 said maintenance advice to maintenance personnel, said maintenance
9 communication means having an input for receiving said maintenance
10 advice from said receiver.

1 ¹³
2 73. (New) The aircraft maintenance system of claim 72 wherein said maintenance advice is
3 provided aurally to said maintenance personnel.

1 ¹⁴
2 74. (New) The aircraft maintenance system of claim 68 wherein said central station includes a
3 storage system for storing said aircraft performance and control parameters.

1 ¹⁵
2 75. (New) An aircraft maintenance system comprising:
3 a transmitter configured for transmission of data across a communication
4 network, said transmitter positionable to be located on an aircraft;
5 a ground based station connected to said communication network configured
6 to receive and analyze said transmission of data to generate
7 maintenance advice for said aircraft; and
8 a sensor multiplexer located on said aircraft, said sensor multiplexer having a
9 plurality of inputs for receiving aircraft performance and control
10 parameters from aircraft sensors and an output in communication with
 said transmitter for providing said data to said transmitter;

11 wherein said data further includes an aircraft identifier unique to a particular
12 aircraft.

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1 76. (New) The aircraft maintenance system of claim 75, wherein said ground based station is
2 further configured to transmit data on said communication network and said maintenance advice
3 is transmitted from said ground based station to said aircraft, further comprising:

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4 a receiver located on said aircraft, said receiver configured to receive data
5 from said communication network; and
6 a maintenance communication means which receives maintenance advisory
7 data from said receiver and provides maintenance advice to
8 maintenance personnel,

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1 77. (New) The aircraft maintenance system of claim 75 wherein said ground based station
2 includes a storage system for archiving said aircraft performance and control parameters.

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1 78. (New) A method for real-time monitoring and archiving of aircraft performance data
2 including the steps of:

3 providing a performance sensor in an aircraft, said performance sensor having an
4 output indicative of an aircraft performance parameter;
5 electronically transmitting at least said aircraft performance parameter to a global
6 communication network;

7 receiving said aircraft performance parameter from said global communication
8 network at a ground based station;
9 analyzing said aircraft performance parameter at said ground based station;
10 generating an aircraft maintenance advisory when the analysis of said aircraft
11 performance parameter indicates an aircraft problem; and
12 archiving said aircraft performance parameter at said ground based station.

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1 79. (New) The method for real-time monitoring and archiving of aircraft performance data
2 according to the method of claim 78 further including the steps of:
3 transmitting said aircraft maintenance advisory;
4 receiving said aircraft maintenance advisory on said aircraft; and
5 displaying said aircraft maintenance advisory on said aircraft.

24
1 80. (New) A digital data communication system for an aircraft comprising:
2 a transceiver located on the aircraft, said transceiver configured to transmit
3 and receive digital data to and from a global communication network
4 while said aircraft is in-flight; and
5 a central station configured to transmit and receive digital data to and from
6 said global communication network,
7 wherein a transmission by an aircraft on said global communication network
8 includes an identifier, said identifier being unique to a particular
9 aircraft.

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1 81. (New) The digital data communication system of claim 80 further comprising:
2 a sensor multiplexer having a plurality of inputs for receiving information
3 from a plurality of aircraft sensors and an output for digitally
4 communicating said information to said transceiver for transmission
5 via said global communication network.

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1 82. (New) The digital data communication system of claim 81 wherein said plurality of
2 aircraft sensors includes a GPS receiver.

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1 83. (New) The digital data communication system of claim 81 wherein said plurality of
2 aircraft sensors includes an acoustic sensor for receiving audible information.

28
1 84. (New) The digital data communication system of claim 80 further comprising a display
2 means on said aircraft, said display means configured to display information encoded in said
3 digital data received by said transceiver.

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1 85. (New) The digital data communication system of claim 80 wherein said central station
2 includes data storage and at least a portion of said digital data transmitted from said aircraft is
3 stored in said data storage.

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1 86. (New) The digital data communication system of claim 85 wherein said portion of said
2 digital data includes data selected from the group consisting of:

- 3 (a) airspeed of the aircraft;
4 (b) aircraft attitude;
5 (c) fuel status of the aircraft;
6 (d) engine status of the aircraft;
7 (e) flight control positions;
8 (f) landing gear status; and
9 (g) control surface positions.

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1 87. (New) The digital data communication system of claim 86 wherein said portion of said
2 digital data is analyzed at said central station to determine if a flight safety advisory or a
3 maintenance advisory is warranted.

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1 88. (New) The digital data communication system of claim 87 further comprising a display
2 means on said aircraft, wherein said central station transmits said flight safety advisory or said
3 maintenance advisory to said transceiver and said display means is configured to display said
4 flight safety advisory or said maintenance advisory.

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1 89. (New) A digital data communication system for an aircraft comprising a receiver
2 configured to receive a transmission from a central station while the aircraft is airborne, said
3 transmission being relayed to said receiver by way of a satellite and said transmission comprising
4 digitally encoded information, wherein said digitally encoded information includes an identifier
5 unique to a particular aircraft.

1 ³⁴
2 90. (New) The digital data communication system of claim 89 wherein said digitally
3 encoded information includes weather information.

1 ³⁵
2 91. (New) The digital data communication system of claim 89 wherein said digitally
3 encoded information includes maintenance advisory information.

1 ³⁶
2 92. (New) A telemetric crash data recorder comprising:
3 a sensor multiplexer receiver and transmitter; and
4 a central ground based station having a data storage device,
5 wherein said sensor multiplexer receiver and transmitter receives aircraft
6 performance and control parameters from existing sensors on an
7 aircraft and transmits said performance and control parameters to said
8 central ground based station over a world wide communication system
9 for storage in said data storage device.

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2 93. (New) The telemetric crash data recorder of claim 92 further comprising:
3 a GPS receiver in communication with said sensor multiplexer receiver and
4 transmitter such that a position of said aircraft is transmitted to said
5 central ground based station.

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2 94. (New) The telemetric crash data recorder of claim 93 wherein said central ground station
3 includes a processor for analyzing performance and control parameters and said aircraft position
4 such that, in the event of a crash, said processor will estimate a crash site.

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2 95. (New) The telemetric crash data recorder of claim 93 wherein said performance and
3 control parameters comprise information recorded by an on board flight data recorder.
